The Journal of Thoracic and
Cardiovascular Surgery
August 1997

or patients at high risk with slow progression of chylopericardium.

Unlike chylothorax, chylopericardium should not result in visible leakage of the thoracic duct. Therefore intraoperative attempts at duct visualization seems nonessential. We favor "mass ligation," as recommended by Murphy and Piper,[4] allowing a complete interruption of all possible lymphatic vessels, especially in the case of double or triple ducts at this level.[5] For this technique the right-sided approach is more appropriate and is preferred by most authors.[6]

In our patient the minimal amount of loculated pericardial fluid was on the right side and hardly visible on echocardiographic follow-up after 1 month. We do not believe that this fluid is related to the size of the pericardial window, as suggested by Yüksel and coauthors, because we had performed a partial pericardiectomy of 7 × 5 cm on the right side. In our experience, the extent of pericardial fenestration on the left is also limited by the inherent possibility of heart herniation through the pericardium. Long-term follow-up was not suggested in our report, but we can update our case report now by an uneventual radiologic and clinical 2-year follow-up.

Markus Furrer, MD
Department of Thoracic/Cardiovascular Surgery
University of Bern
Inselspital
Bern CH-3010, Switzerland

REFERENCES

1. Chan BK, Murphy MC, Rodgers BM. Management of chylopericardium. J Pediatr Surg 1990;25:1185-9.
2. Akamatsu H, Aman J, Sakamoto T, Suzuki A. Primary chylopericardium. Ann Thorac Surg 1994;58:262-6.
3. Furrer M, Hopf M, Ris HB. Isolated primary chylopericardium: treatment by thoracoscopic thoracic duct ligation and pericardial fenestration. J Thorac Cardiovasc Surg 1996;112: 1120-1.
4. Murphy TO, Piper CA. Surgical management of chylothorax. Ann Surg 1977;43:719.
5. Anson BJ. An atlas of anatomy. Philadelphia: WB Saunders; 1950.
6. Shields TW. Management of chylothorax. In: General thoracic surgery. 4th ed. Malvern: Williams & Wilkins; 1994. pp. 719-20.

12/8/82355

Technique for one-lung ventilation during video-assisted thoracoscopic surgical interruption of patent ductus arteriosus in children

To the Editor:

Subsequent to the initial half dozen cases of patent ductus arteriosus (PDA) done with the use of video-assisted thoracoscopic surgery (VATS), we have modified the technique of one-lung ventilation for VATS. We now achieve right-sided one-lung ventilation by intubating the right main-stem bronchus. Right main-stem bronchial intubation is performed by insertion of a single-lumen endotracheal tube with left-facing bevel (with the tip of the endotracheal tube to the right of center) deep into the tracheobronchial tree. This results in right main-stem intubation in 100% of cases. After induction of anesthesia and endotracheal intubation, bilateral air entry is checked and the single-lumen endotracheal tube is advanced deeply and then withdrawn slowly until breath sounds are heard all over the right hemithorax and no breath sounds on the left hemithorax. The length of the endotracheal tube needed to achieve this single lung ventilation is noted on the external surface of the tube, and then the tube is withdrawn further to maintain double lung ventilation during positioning and draping of the patient. Once thoracostomies are performed for VATS, one-lung ventilation is achieved by inserting the endotracheal tube to a distance noted previously. By means of this technique, the left lung is totally unventilated and collapsed to the entire satisfaction of the anesthetic and surgical team. During one-lung ventilation, the inspired oxygen fraction is increased to 100%, tidal volume reduced by 20%, and respiratory rate increased by 20%. The monitoring includes electrocardiogram, direct arterial pressure, central venous pressure, pulse oximetry, end-tidal carbon dioxide analysis, and blood gas analysis. This method of one-lung ventilation is simple (no extra equipment/bronchoscopy is required) and safe (no risk of slippage of the blocker).

We have used this technique of right main-stem intubation for VATS during operations for PDA in 45 children, ages ranging from 6 months to 9 years (mean 3.6 years) and weights ranging from 8 to 27 kg (mean 15.7 kg). Now we are routinely performing PDA clipping through VATS using right main-stem bronchial intubation and have abandoned the new technique of one-lung ventilation described by Vakamudi and associates[1] in favor of right main-stem bronchial intubation for obvious reasons.

Kanchi Muralidhar, MD
Shetty Devi Prasad, MS
B.M. Birla Heart Research Centre
1/1, National Library Ave.
Calcutta, 700 027, India

REFERENCE

1. Vakamudi M, Shenoy V, Halder J, et al. A new technique for one-lung ventilation during video-assisted thoracoscopic surgical interruption of patent ductus arteriosus in children. J Thorac Cardiovasc Surg 1995;110:273-4.

12/8/82677

Tumor dissemination after video-assisted thoracic surgery: What does it mean?

To the Editor:

We read with interest the recently published article on tumor dissemination after video-assisted thoracic surgery (VATS) in 21 cases by Downey and colleagues.[1] The authors conclude that thoracoscopic wedge excision of a lung cancer is an inadequate cancer operation

and, should a malignant tumor be diagnosed during thoracoscopy, a thoracotomy and lobectomy should be performed. This recommendation was based on the multicenter trial of the Lung Cancer Study Group.[2]

Several comments on the subject seem appropriate.

1. Lobectomy and wedge resection are, obviously, two different operations, regardless of whether they are done by VATS or not. Using the terms *VATS lobectomy* and *VATS wedge resection* interchangeably is confusing. These two operations cannot be ascribed to one single entity called just VATS. It is difficult to draw any conclusion from this report because it is unknown which VATS procedure was performed in each of the 21 cases. However, in three cases, in which the actual VATS procedure was specified, it is more likely that dissemination was related to wedge resection and segmentectomy rather than to the method of entering the thoracic cavity. This relationship, indeed, has been clearly shown by the Lung Cancer Study Group.[2] In this report lesser resections (wedge and segmentectomy) were compared with lobectomy in the management of stage I non-small-cell lung cancers. A 25% increased risk of local recurrence in patients who had been randomized to a lesser resection was reported.

2. Regarding the methods used in this report, authors surveyed 55 members of the Video-Assisted Thoracic Surgery Study Group (VATSSG). The total number of procedures performed by the members of the VATSSG is unknown. Some of the procedures reported were not performed by members of the VATSSG; the operations were performed by other surgeons at the same institution, or else the patients were referred for postoperative consultation from other institutions. We agree with the authors' statement that this is a voluntary reporting based on recollection and should be considered a collection of anecdotes. This report of 21 cases, in fact, represents a description of a rather diverse group of 18 patients and three case reports. Inasmuch as this article was published as an original communication in the Journal, the title of the report could make a misleading impression, that it was a result of a study conducted by the VATSSG, showing interrelation between dissemination and VATS.

3. Among these 21 cases, only nine represent primary lung cancers. A detailed report of one of these nine cases has been published before.[3] Five patients had disease metastatic to the lung. This means that these patients had generalized malignant disease and that tumor cells were disseminated by the time of the operation. In these five cases, it is unknown whether further dissemination was related to VATS or rather to an already ongoing generalized malignant process. The site of recurrence in one patient with melanoma was pleura. This might not be related to the actual operation at all. The incision was the site of recurrence in all five patients with mesotheliomas. We agree with the authors that the propensity for mesotheliomas to grow into thoracotomy and chest tube incisions is widely recognized and mesotheliomas should be considered separately from the other cases. The last two patients had small-cell carcinoma and esophageal squamous carcinoma. It is impossible to find any interrelation between tumor dissemination, recurrence, and the VATS procedure in these particular 12 cases.

4. Recurrence in a suture line is most likely the result of an inadequate resection and has nothing to do with how the specimen is removed. This can happen after wedge resection performed through thoracotomy, as well as by VATS.

5. The authors conclude that should a malignant tumor be diagnosed during thoracoscopy, a thoracotomy and lobectomy should be performed. However, nothing in this report supports the conclusion that thoracotomy is necessary.

6. Finally, it is time for all of us to realize that VATS is not thoracoscopy.[4] These terms must not be used interchangeably.

Similar case reports on tumor dissemination by VATS have been published.[3, 5, 6] In all these reports lesser resections were performed. In the majority of these cases no protective plastic bags were used. In all cases the authors blamed VATS rather than its inappropriate application.

We share the opinion that wedge excision is an inadequate cancer operation. This is true regardless of whether VATS or an open technique is used.

On the contrary, we believe that by using special plastic bags and careful handling of the resected tissue, dissemination can be avoided during VATS lobectomy. Once excised, the specimen must be placed in a protective container before removal. We agree with Lewis, Caccavale, and Sisler,[7] who adamantly recommend a sealed container for the removal of all malignant tissue.

It is important that authors reporting similar cases specify whether a protective container was used or not and which VATS operation was performed—a lobectomy or wedge resection. It is reasonable to believe that dissemination in these case reports relates to wedge resection and segmentectomy rather than to VATS. To our knowledge, the literature contains no reports refuting the opinion that VATS lobectomy with placement of the specimen in a sealed container before removal is an adequate operation for patients with peripheral T1 N0 M0 non-small-cell lung cancer.

Ulf Hermansson, MD
Igor E. Konstantinov, MD
Claes Arén, MD, PhD
Department of Cardiothoracic Surgery
University Hospital
S-581 85, Linköping, Sweden

REFERENCES

1. Downey RJ, McCormack P, LoCicero J. Dissemination of malignant tumors after video-assisted thoracic surgery: a report of twenty-one cases. J Thorac Cardiovasc Surg 1996;111:954-60.
2. Ginsberg RJ. The comparison of limited resection to lobectomy for T1N0 non-small cell lung cancer: LCSG 821. Chest 1994;106:3185-95.

The Journal of Thoracic and Cardiovascular Surgery
August 1997

3. Fry WA, Siddiqui A, Pensler JM, Mostafavi H. Thoracoscopic implantation of cancer with a fatal outcome. Ann Thorac Surg 1995;59:42-5.
4. Lewis RJ. VATS is not thoracoscopy. Ann Thorac Surg 1996;62:623-32.
5. Buhr J, Hurtgen M, Kelm C, Schwemmle K. Tumor dissemination after thoracoscopic resection for lung cancer. J Thorac Cardiovasc Surg 1995;110:855-6.
6. Walsh GL, Nesbitt JC. Tumor implants after thoracoscopic resection of a metastatic sarcoma. Ann Thorac Surg 1995;59: 215-6.
7. Lewis RJ, Caccavale RJ, Sisler GE. Does video-assisted thoracic surgery disseminate tumor? J Thorac Cardiovasc Surg 1996;111:1109-10.

12/8/82098

Reply to the Editor:

We appreciate the comments of Drs. Hermansson, Konstantinov, and Aren in response to our article. Unfortunately, they have misread our conclusion, which may be summarized as follows: The case reports presented raise concerns that the techniques of manipulation of malignant tissue during VATS procedures, *regardless of the extent of resection,* may lead to an increased rate of suture line occurrences; this increase is the result of inadequate tissue margins caused by an inability to palpate extent of disease. Furthermore, the reported cases raise concerns that disruption of tumor-bearing tissue with implantation within the pleural cavity or within chest wall incisions occurs at rates higher than seen during open thoracotomy and intrathoracic resections. The technique they recommend of placing specimens into sealed bags before withdrawal from the chest is reasonable and may spare incisional contamination; however, this will not relieve concerns regarding inadequate margins or disruption within the pleural cavity.

The morbidity and mortality of open procedures for the resection of intrathoracic malignant tumors are well documented in the literature, as is the previously vanishing rare problem of tumor implantation in an incision. Before VATS techniques are generally adopted, we advocate well-designed trials that will document both that VATS techniques are as safe as open techniques and that, stage for stage, VATS techniques provide 3- and 5-year survivals equal to or better than those achieved with open techniques.

Robert J. Downey, MD
Patricia McCormack, MD
Division of Thoracic Surgery,
Memorial Sloan-Kettering Cancer Center,
New York, NY 10021
Joseph LoCicero III, MD
Division of Thoracic Surgery
New England Deaconess Hospital
Boston, MA 02215

12/8/82099

Effect of milrinone on coronary artery bypass grafts

To the Editor:

The effect of vasodilators on coronary artery bypass grafts is always an interesting topic because the vasoconstriction of the grafts may cause hypoperfusion syndrome, which may cause a serious problem in those who undergo coronary artery bypass with arterial grafts.[1]

With interest, I have read the article authored by Liu and associates[2] regarding the effect of a relatively new vasodilator, the phosphodiesterase III inhibitor milrinone, which also possesses inotropic effects. In their study, the authors investigated the effect of milrinone in the human internal thoracic artery with regard to the vasorelaxant effect and the role of endothelium in such effect. Their findings in this article are similar to our previous reports in pharmacology journals.[3,4] In our reports, we have found that milrinone has vasorelaxant effects against all four vasoconstrictors we tested: potassium, U46619, phenylephrine, and endothelin-1. We have also tested the depressant effect of milrinone on the contraction induced by these vasoconstrictors.[3] In addition, we have found that the vasorelaxant effect of milrinone is endothelium independent.[3] I am glad to see that these results have been reconfirmed by Liu and his associates. Furthermore, we have discovered that milrinone and nitroglycerin have a synergistic effect that is clinically very important, because these two drugs are sometimes used together in the intensive care unit.

However, on the basis of our findings with regard to the effect and the use of milrinone, we would emphasize three points: (1) Relaxation of milrinone in the potassium-precontracted internal thoracic artery is complete at the highest concentration (−4 log M), although the sensitivity to this agent is lower (less potent) than to the other three agents. This demonstrates the selectivity of the vasorelaxant effect of this vasodilator. (2) The inhibitory effect of milrinone in the contraction induced by the four important vasoconstrictors is also slightly selective. It was more potent in inhibition of the receptor-mediated (by endothelin-1 and phenylephrine) than the depolarizing agent potassium-mediated contraction (Fig. 1). This is shown by the more significant suppression effect in the contraction induced by endothelin-1 and phenylephrine.[3] (3) There is a synergistic vasorelaxant effect of the phosphodiesterase III inhibitor milrinone and the nitrovasodilator nitroglycerin in human conduit arteries. This effect may be beneficial to patients undergoing coronary artery bypass grafting and to other patients requiring these vasodilators. Reduced doses of the vasodilators may be sufficient to produce vasodilatation similar to that produced by either of them alone at higher concentrations (Fig. 2).[4]

On the basis of this information, we would suggest clinical considerations and indications for the use of milrinone after coronary artery bypass grafting as follows:

1. The use of milrinone is best indicated when the